

and the whole ground of the engineering lectures is provided for in the equipment of the laboratories. The machines are large in number and in capacity, so that every student performs experiments on an adequate scale. The work is chiefly pursued in the third and fourth years, and occupies from four to six hours weekly. In some laboratories there are full-size locomotives mounted, so that running tests can be made, and special courses are arranged for those who wish to take up the mechanical side of railway practice. Facilities are given by the railroad companies for testing under the conditions of actual running.

The shops gave the impression of being thoroughly practical, and on such a scale that the knowledge acquired there by the student would be of use in his subsequent professional life.

The greater size of the Continent is, perhaps, partially responsible for the following paragraph in the committee's report, although really if education were properly appreciated in this country, our island is large enough for us to follow the example. The paragraph we refer to looks very attractive to those whose work in this country lies in colleges cramped in the middle of great cities. It runs as follows:—

"We were very much struck with the amount of ground occupied by the colleges, each building standing in its own grounds, so that it is well lighted on every side. Usually there is a large entrance hall, a fine staircase, and wide corridors leading to class-rooms and laboratories. The floor space in the laboratories is generally very much greater than with us. The apparatus, instead of being huddled away in dark corners, is set out and classified as if for exhibition, while the machinery occupies a space worthy of its importance."

We observe also that every college possesses departmental libraries and reading-rooms available for the students, in addition to the large central library and reading-room.

The social aspect of university life is not forgotten, and the following glorified edition of a student's union is well worthy of imitation:—

"The University of Pennsylvania at Philadelphia possesses in Houston Hall a fine building given to the University by an old graduate, in memory of his son, who was also a graduate. It is a club-house for the students, any student becoming a member for two dollars per annum. In the building are reading billiard and smoking rooms, a luncheon-room, a gymnasium, a swimming bath, and rooms for college societies. The hall is entirely and very well managed by the students. It is regarded by the staff as having a most excellent influence on student life."

In concluding this part of the general report of their American visit, the committee make a well-deserved comment, which we will presently quote, for nothing more splendid in the direction of educational endowment has been seen in our times than the magnificent sums which wealthy American citizens are willing to place at the disposal of university authorities. They do, indeed, realise, as we do not, or at least have not yet, the immense, the super-eminent, importance of real education and knowledge, to a country and an empire which has to hold its own against ever-increasing competition, and constantly to make its way in fresh uncivilised regions. The following are the concluding general remarks:—

"We desire to express our admiration alike for the high ideal of scientific education, which is the aim in American universities, and for the enthusiasm in all classes which renders it possible to approach so near that ideal. Everywhere we found evidence that the wealthier citizens realise the importance of university education, and encourage the universities by generous gifts; and everywhere, both by teachers and by students, these gifts are being used for higher learning and research."

THIRD INTERNATIONAL CONFERENCE ON A CATALOGUE OF SCIENTIFIC LITERATURE, LONDON, JUNE 1900.

LIST OF DELEGATES APPOINTED TO ATTEND THE CONFERENCE.

Austria.—Prof. E. Weiss (Kaiserliche Akademie der Wissenschaften, Vienna); Prof. Karl Toldt (Universität, Vienna).

France.—Prof. G. Darboux (Membre de l'Institut de France); Dr. J. Deniker (Bibliothécaire du Muséum d'Histoire Naturelle, Paris); Prof. H. Poincaré (Membre de l'Institut de France).

Germany.—Prof. Dr. F. Klein (Geheimer Regierungs-Kath,

Universität, Göttingen); Prof. Dr. B. Schwalbe (Direktor, Real-Gymnasium, Berlin); Dr. F. Milkau (Oberbibliothekar, Universität, Berlin).

Greece.—Mons. de Metaxas (Chargé d'Affaires for Greece)

Hungary.—Dr. August Heller (Bibliothekar, Ungarische Akademie, Buda-Pesth); Dr. Theodore Duka (Hon. Member of the Hungarian Academy of Sciences)

Italy.—Prof. Giacomo Ciamician (R. Università, Bologna); Prof. Raffaello Nasini (R. Università, Padua).

Japan.—Prof. Einosuke Yamaguchi (Imperial University of Kioto).

Mexico.—Señor Don Francisco del Paso y Troncoso.

Norway.—Dr. Jörgen Brunchorst (Secretary, Bergenske Museum).

Switzerland.—Dr. Jean Henri Graf (President, Commission de la Bibliothèque Nationale Suisse, Berne); Dr. Jean Bernoulli (Librarian, Bibliothèque Nationale Suisse, Berne).

United Kingdom.—Representing the Government: The Right Hon. Sir John E. Gorst, Q.C., M.P., F.R.S. (Vice-President of the Committee of Council on Education). Representing the Royal Society of London: Sir Michael Foster, K.C.B., Sec. R.S.; Prof. Arthur W. Rücker, Sec. R.S.; Prof. H. E. Armstrong, F.R.S.; Sir J. Norman Lockyer, K.C.B., F.R.S.; Dr. Ludwig Mond, F.R.S.; Dr. T. E. Thorpe, For. Sec. R.S.

Cape Colony.—Sir David Gill, K.C.B., F.R.S.; Roland Trimen, Esq., F.R.S.

India.—Lieut.-General Sir Richard Strachey, G.C.S.I., F.R.S.; Dr. W. T. Blanford, F.R.S.

Natal.—Sir Walter Peace, K.C.M.G. (Agent-General for Natal).

New Zealand.—The Hon. W. P. Reeves (Agent-General for New Zealand).

Queensland.—The Hon. Sir Horace Tozer, K.C.M.G. (Agent-General for Queensland).

ACTA.

Opening Meeting, Tuesday, June 12, at the rooms of the Society of Antiquaries, at 10 o'clock.

(1) Prof. Darboux moved that Sir John E. Gorst be the President of the Conference. The motion having been carried unanimously—

(2) Sir John Gorst took the chair and welcomed the delegates.

(3) On the motion of Sir M. Foster, seconded by Prof. Darboux, it was resolved that Dr. F. Milkau be the secretary for the German language; that Dr. Jean Bernoulli and Dr. J. Deniker be the secretaries for the French language; that Prof. Giacomo Ciamician be the secretary for the Italian language; that Prof. H. E. Armstrong be the secretary for the English language.

(4) That the secretaries, with the help of shorthand reporters, be responsible for the *procès verbal* of the proceedings of the Conference in their respective languages.

(5) Sir Michael Foster read out the names of delegates appointed to attend the Conference.

(6) On the motion of Sir Michael Foster, it was resolved—(i.) That the meeting adjourn at 1 p.m., and meet again at 2.30 p.m.; (ii.) that on Wednesday, the meeting commence at 11 a.m.

(7) On the motion of Sir Michael Foster, seconded by Prof. Rücker, it was resolved that English, French, German and Italian be the official languages of the Conference, but that it shall be open for any delegate to address the Conference in any other language, provided that he supplies for the *procès verbal* of the Conference, a written translation of his remarks into one or other of the official languages.

(8) Sir Michael Foster presented the Report of the Provisional International Committee, and it was resolved that the report be received.

(9) The following resolutions were then agreed to:—(i.) That the publication of a card catalogue be postponed for the present; (ii.) that the book catalogue be at first issued only in the form of annual volumes.

(10) Sir Michael Foster having moved (iii.) that the catalogue include both an authors' and a subject index, according to the scheme of the Provisional International Committee; Prof. Rücker thereupon explained the financial position, and the delegates of the various countries stated to what extent they were authorised to promise contributions towards the expenses of the catalogue. From these statements it appeared that subscriptions to 163 sets of volumes (or their equivalent) of the

catalogue, to the value of £2,771, would be guaranteed, viz. as follows:—

	£
Germany	45 sets equivalent to 765
United Kingdom	45 „ „ „ 765
France	35 „ „ „ 595
Italy	27 „ „ „ 459
Switzerland	6 „ „ „ 102
Norway	5 „ „ „ 85

Other delegates estimated that the probable contributions from their countries would be:—

	£
Austria	16 sets equivalent to 272
Hungary	4 „ „ „ 68
Japan	5 „ „ „ 85
Mexico	5 „ „ „ 85

It was further estimated that the British Colonies and Dependencies would subscribe for at least 25 sets, equivalent to 425/. Taking into account the subscriptions to be expected from the United States, Russia, Holland, Sweden, and a number of other countries, as well as the probability of outside sales, the Conference was of opinion that the necessary subscriptions to cover the cost of 300 sets of the catalogue would be obtained. At the close of the discussion the motion above set forth was unanimously agreed to.

(11) In the course of the discussion, it was stated by delegates from several countries that all the sets subscribed for would be distributed among public institutions, and that they contemplated the private sale of the catalogue in addition.

Second Meeting, Wednesday, June 13.

(12) The following motions, of which notice had been given on the previous day, were considered and adopted:—

(A.) The Conference is of opinion that the financial prospects of the enterprise are sufficiently satisfactory to warrant further steps being taken toward the publication of the catalogue, in view of the fact that the representatives of the various countries have declared that the governments or corporations they represent are willing to subscribe for the number of complete sets of copies at the cost stated in paragraph 10.

La Conférence décide: que le côté financier de l'entreprise est suffisamment élucidé pour justifier les arrangements ultérieurs nécessaires pour la publication du Catalogue, les représentants des différents pays ayant en effet déclaré que les gouvernements ou les corps savants qu'ils représentent sont prêts à souscrire un nombre de séries complètes du Catalogue, et aux prix indiqués dans le § 10.

Angesichts der von den Vertretern der verschiedenen Länder abgegebenen Erklärung, dass die durch sie vertretenen Länder oder Körperschaften entschlossen sind, auf die in § 10 angegebene Zahl vollständiger Exemplare zu dem ebenda festgesetzten Preise zu subscribieren, gibt die Konferenz der Meinung Ausdruck, dass die finanziellen Aussichten des Unternehmens zufriedenstellend genug sind, um weitere Schritte zur Veröffentlichung des Katalogs zu rechtfertigen.

La Conferenza è d'avviso che avendo i rappresentanti dei diversi paesi dichiarato che i governi o i corpi scientifici da loro rappresentati sono pronti a sottoscrivere nella misura indicata al § 10, si può ritenere l'impresa abbastanza soddisfacente dal lato finanziario per autorizzare gli ulteriori passi che sono necessari per la pubblicazione del catalogo.

(B.) That, pending the appointment of the International Council, a Provisional International Committee be appointed which shall be entrusted with the duty of approaching, through the Royal Society, such countries as may be necessary, with the view of obtaining their adhesion to the scheme for the publication of the catalogue, or promises of financial support.

Que jusqu'à la constitution définitive du Conseil International, un comité international provisoire soit nommé. Ce comité sera chargé de se mettre en rapport par l'intermédiaire de la Société Royale, avec les personnes autorisées des différents pays, suivant les nécessités de la situation, afin d'obtenir de ces pays l'adhésion ou l'appui financier à l'œuvre du Catalogue.

Dass bis zur Einsetzung des International Council ein Provisional International Committee ernannt wird, mit dem Auftrage, sich durch die Vermittelung der Royal Society mit den in Betracht kommenden Ländern in Verbindung zu setzen, um sich ihrer Mitwirkung bei der Veröffentlichung des Katalogs

zu versichern oder ihre Zusagen für finanzielle Unterstützung zu erwirken.

Che sia nominato un comitato internazionale provvisorio sino a che non sarà costituito definitivamente il Consiglio Internazionale. Questo comitato avrà l'incarico di mettersi in comunicazione mediante la Royal Society con i diversi paesi, secondo che sarà necessario, per ottenere la loro adesione al progetto di pubblicazione del catalogo o la promessa del loro appoggio finanziario.

(C.) The said Provincial Committee is further authorised to make other preparations for the publication of the catalogue, but without incurring financial responsibility.

Inasmuch as it will be necessary for some one corporation to make the necessary contracts and undertake the final financial responsibilities, the Provincial Committee is authorised to include among such preparations, negotiations either with the Royal Society, or with another corporation, or with a government, or with a publisher, but the confirmation of all such preparations, and the carrying out of any final agreement or contract, shall rest with the International Council.

Ce comité sera autorisé en plus à prendre d'autres mesures préliminaires en vue de la publication du Catalogue; mais il n'aura aucune responsabilité financière.

Comme il sera nécessaire, pour un corps constitué quelconque, de conclure des traités et d'encourir les responsabilités financières définitives, le comité provisoire est autorisé à comprendre parmi les mesures préparatoires de ce genre, les négociations soit avec la Société Royale, soit avec un autre corps constitué, soit avec un gouvernement, soit avec un éditeur. Toutefois la confirmation de toutes ces mesures préparatoires, ainsi que l'arrangement financier définitif ou conclusion d'un traité, doivent incomber au Conseil International.

Das genannte Provisional Committee wird ferner beauftragt, andere Vorbereitungen zur Veröffentlichung des Katalogs zu treffen, ohne jedoch eine finanzielle Verantwortlichkeit einzugehen.

Soweit es notwendig ist, dass eine Korporation die erforderlichen Verträge abschliesst und die endgültige finanzielle Verantwortlichkeit übernimmt, wird das Provisional Committee ermächtigt, derartige Vereinbarungen entweder mit der Royal Society oder mit einer anderen Korporation oder mit einer Regierung oder mit einem Verleger einzuleiten, indem die Bestätigung solcher Verhandlungen wie die Ausführung der endgültigen Vereinbarungen dem International Council vorbehalten bleibt.

Questo comitato sarà inoltre autorizzato a prendere altre misure preliminari per la pubblicazione del catalogo, senza avere tuttavia nessuna responsabilità finanziaria.

E poichè è necessario per un corpo costituito di concludere dei contratti e d'assumere la responsabilità finanziarie definitive, così il comitato provvisorio è autorizzato ad includere nei lavori preparatori le trattative o colla Royal Society o con altre corporazioni o con un governo o con un editore: ma la conferma di queste trattative e l'approvazione finale del contratto sarà riservata al Consiglio Internazionale.

(13) The "Scheme for the Publication of an International Catalogue of Scientific Literature" was then considered, and it was resolved—

That Article I. be approved—
Omitting the words in paragraph 5 on page 5, lines 9 and 10, "the limits of the several sciences to be determined hereafter," and also the words, page 5, lines 27-29.

That Article II. be approved—
Omitting the words "the same . . . regulations were" in paragraph 10, page 7;

Adding Italian to the three languages mentioned in paragraphs 10 (a) and (b);

Altering the word "delegate" to "contracting body (as hereinafter defined)" in paragraph 10 (d);

Omitting at the top of p. 8 the words within square brackets;

Omitting in paragraph 11, p. 8, the words within square brackets: "The . . . Appendix II," and substituting the following: "Each contracting body shall have one vote in deciding all questions brought before the Council";

And inserting in paragraph 13, before the words: "There shall also be . . ." the words: "If the International Council so decide."

That Article III. be approved without change.

That Article IV. be approved, omitting the opening paragraph in square brackets.

That Article V. be approved, inserting the words: "or as soon after that date as the International Council may decide," in paragraph 29, after "January 1, 1901."

That Article VI. be approved, inserting at the beginning of paragraph 32, the words: "Unless the International Council decide otherwise";

Substituting in paragraph 34, p. 14, line 33, "instructed" for "authorised."

That Article VII., excepting paragraph 37, be approved—

Omitting paragraph 35 and the next paragraph in square brackets, and substituting therefor: "any body which establishes a regional bureau shall be termed a contracting body."

Omitting the words "which takes a complete share" in the first line of paragraph 40, and omitting the whole of the second sentence in this paragraph, and omitting the three appendices.

(14) It was further resolved to substitute for paragraph 37, Section VII., page 15, the following:—

"That it will be an instruction to the Provisional Committee to negotiate with the several contracting bodies with reference to the sale in their respective regions of copies other than those subscribed for by the contracting bodies."

Que les instructions soient données au comité provisoire pour négocier avec les différents corps contractants la question de la vente dans leurs pays respectifs des exemplaires souscrits par ces corps.

Aufgabe der Provisional Committee wird es sein, den verschiedenen contrahierenden Körperschaften (contracting bodies) bezüglich des Verkaufs von Exemplaren in ihren Ländern, ganz abgesehen von der gewährleisteten Anzahl, bestimmte Festsetzungen vorzuschlagen.

(15) It was resolved that the Provisional Committee contemplated in Resolution 12 (B) be constituted as follows:—Prof. Armstrong, Dr. Brunchorst, Dr. Graf, Dr. Milkau, Prof. Nasini, Prof. Poincaré, Prof. Weiss; power being given to the Royal Society, while retaining only a single vote, to nominate further members, and power being given to the Committee to appoint substitutes if any of those named were unable to serve, and also to co-opt two new members.

(16) On the motion of Sir Michael Foster and Prof. Rücker, it was resolved that the Royal Society be requested to appoint the Secretary to the Provisional Committee, and to meet provisionally such expenses as the Committee may incur.

(17) It was resolved that the *procès verbal* of the Conference be signed by the president and secretaries.

(18) The Royal Society was requested to undertake the editing, publication, and distribution of a verbatim report of the proceedings of the Conference.

(19) On the motion of Prof. Schwalbe, a vote of thanks to Sir John Gorst for presiding over the Conference was passed by acclamation.

(20) On the motion of Sir Michael Foster, the thanks of the Conference were accorded to the Society of Antiquaries for the use of their rooms.

(Signed) JOHN E. GORST.
HENRY E. ARMSTRONG.
DR. JOH. BERNOULLI.
G. CIAMICIAN.
I. DENIKER.

THE ROYAL SOCIETY CONVERSAZIONE.

THE exhibitions at the conversazione, which took place on the 20th inst., were numerous and interesting. There was a great wealth of photographs, including a large collection illustrating the results obtained during the last total eclipse. Among the other objects exhibited were the following:—

Prof. W. Ramsay, F.R.S., and Dr. M. W. Travers exhibited the inert atmospheric gases; their spectra, and some of the apparatus used in determining their physical properties.

The Meteorological Office exhibited North Atlantic weather charts, winter, 1898-99.

Prof. J. W. Judd, C.B., F.R.S., on behalf of the Coral-Reef Committee of the Royal Society, exhibited specimens from the reefs of Funafuti.

Mr. J. Mackenzie Davidson exhibited a stereoscopic fluoroscope. The stereoscopic fluoroscope is an instrument to enable an observer to see the shadows cast by the Röntgen rays on the fluorescent screen in *stereoscopic relief*.

Prof. W. E. Dalby exhibited a model to illustrate and experiment upon the balancing of four-cylindrical engines.

Prof. Silvanus P. Thompson, F.R.S., showed experiments on the aberration called *Coma*. Coma is an aberration due to the several zones of the lens not having equal focal lengths, and hence, when the lens is transmitting an oblique pencil, the unequal refraction of the different parts gives rise to a singular unilateral distortion of the cones of rays traversing the various zones. In these experiments, the effects are analysed by covering the lens with a series of zones alternately opaque and transparent. Some singular effects can also be produced without the zone plate, by inserting in the oblique pencil, after traversing the lens, objects to cast shadows on a screen. In this way a straight wire can be arranged so that the shadow it casts is a totally-detached circle. Some diagrams of coma, and a string model illustrating their origin, were also shown.

Mr. W. Gowland exhibited Japanese books on botany, intended to show the general character of the work of Japanese botanists from 1759 to 1856.

Mr. W. Gowland, for the Silchester Excavation Committee, exhibited remains of a Roman silver refinery found at Silchester.

Mr. S. Evershed exhibited an electric supply meter (a frictionless motor meter).

Prof. H. S. Hele-Shaw, F.R.S., and Mr. A. Hay showed lines of induction in a magnetic field, represented by stream-line flow.

Prof. E. Ray Lankester, F.R.S., exhibited enlarged models of gnats (mosquitoes) and of human blood-corpuscles infested by the malaria-parasite; modelled by Miss Delta Emmett. (1) Female *Culex pipiens*, Linn., the common brown gnat or mosquito; enlarged twenty-eight times linear. The insect is shown in the act of alighting. This gnat does not harbour the malaria-parasite. (2) Female *Anopheles maculipennis*, Hoffmannsegg, the common spot-winged gnat or mosquito; enlarged twenty-eight times linear. (3) Models of human blood-corpuscles infested with the malaria-parasite (æstivo-autumnal or remittent fever) known as *Haemomenas praecox*; magnified seven thousand five hundred times linear. The blood-corpuscles are transparent, and show the parasites within. The upper row shows the multiplication of the parasite within the corpuscles by fission giving rise to "sporocytes," which creep into other non-infected blood-corpuscles and repeat the process, thus increasing the infection. The lower row shows the formation of a crescent-shaped "gametocyte" within the blood-corpuscle. Instead of breaking up, the parasite enlarges and becomes sausage-shaped. The "gametocytes" thus formed are destined to be swallowed by the gnat *Anopheles*, when they develop in the gnat's stomach—some into eggs and some into spermatozoa.

The Zoological Society of London showed two living female crowned lemurs (*Lemur coronatus*), each with a young one.

Prof. G. B. Howes, F.R.S., and Mr. H. H. Swinerton exhibited reconstructional models, built up from microscopic sections, of the developing head skeleton of the New Zealand reptile, *Sphenodon punctatus*.

Sir John Evans, K.C.B., F.R.S., exhibited ancient cameos and gems, and palæolithic implements from Africa.

Prof. Wyndham Dunstan, F.R.S., exhibited the poisonous lotus of Egypt (*Lotus Arabicus*). (a) Living plant grown at Kew. (b) Dried plants from Nubia. (c) Specimens of the new glucoside, *Lotusine*, and its decomposition products.

Mr. Fred Enock exhibited an aquatic walking-stick insect, with eggs (*Ranastra linearis*).

The following demonstrations, with experiments and lantern illustrations, took place:—

Mr. Fred Enock, life-history of the *Cicindela campestris*—the common tiger beetle. This common Coleopteron goes through its metamorphoses in deep vertical burrows made in the sand by the curious larva, which "sits" at the top of the hole, patiently waiting for its prey to come to it, as it does not go in search of it. Three years are passed in its subterranean den, at the lower end of which it remains during the winter months in a semi-torpid state; activity is resumed at the approach of warm weather.

Prof. J. A. Fleming, D.Sc., F.R.S., demonstrations with an apparatus for the production of short electric waves, and the study of electro-optic phenomena. The apparatus exhibited consists of a radiator for the production of a beam of electric radiation, the wave-length being about eight inches. The radiator is contained in a zinc box, which prevents the diffusion of the radiation in all directions. The receiver consists of a metallic filings tube of the Branly type, associated with a relay and electric bell. The receiver is also contained in a zinc